

Serial No. 10/784,472
Amendment dated June 24, 2009

Atty. Docket No. 280/102
Reply to Office action of December 24, 2008

REMARKS

Prior to entry of this amendment, claims 1-31 are currently pending in the subject application. Claims 1, 12, and 30 are independent. Claim 31 has been amended to correct for a minor informality. Claims 32-40 have been added.

A. Introduction

In the outstanding Office action,

- 1) claim 30 was rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 7,009,652 to Tanida et al. ("the Tanida et al. reference");
- 2) claims 1-4, 6, 9-13, 15-19 and 21-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of U.S. Patent No. 7,003,177 to Mendlovic et al. ("the Mendlovic et al. reference")
- 3) claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of U.S. Patent No. 6,366,319 to Bills ("the Bills reference");
- 4) claims 7 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of U.S. Patent No. 6,137,535 to Meyers ("the Meyers reference");
- 5) claims 8 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of Examiner's Official Notice; and
- 6) claim 31 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of U.S. Patent No. 5,355,222 to Heller et al. ("the Heller et al. reference").

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B. Asserted Anticipation Rejection of Claim 30

In the outstanding Office action, claim 30 was rejected under 35 U.S.C. § 102(e) as being anticipated by the Tanida et al. reference. This rejection is respectfully traversed for at least the reasons set forth below.

Claim 30 recites, in part, "each image blocking portion being smaller than a detector" and that "an output of the plurality of detectors together representing an input image multiplied by a selected transform matrix."

In contrast, the Tanida et al. reference only teaches using different polarizing elements per unit, which, as can be seen in FIG. 1 of the Tanida et al. reference, clearly is larger than a detector, as multiple detectors are included in the unit.¹ Further, while the Tanida et al. reference may disclose using an inverse matrix method for post processing of the image, the use of the polarizing elements as "blocking portions" does not result in the output being an input image multiplied by a selected transform matrix.

Therefore, it is respectfully submitted that the Tanida et al. reference fails to disclose or suggest all of the limitations recited in claim 30. It is respectfully requested that this rejection be withdrawn.

C. Asserted Obviousness Rejection of Claims 1-4, 6, 9-13, 15-19 and 21-29

In the outstanding Office action, claims 1-4, 6, 9-13, 15-19 and 21-29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference. This rejection is respectfully traversed for at least the reasons set forth below.

First, it is respectfully submitted that there is no motivation to combine the Tanida and Mendlovic et al. references. In particular, while the Mendlovic et al. reference may teach "sub-pixel sampling," the sub-pixel sampling in the Mendlovic et al. reference is realized using an amplitude mask having narrow slits extending both horizontally and vertically and

¹ See also, the Tanida et al. reference, col. 6, lines 12-17.

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acquiring multiple images in which the mask has been shifted.² Further, the slits in the Mendlovic et al. reference are transparent.³ Thus, most of the light would be blocked by the amplitude mask of the Mendlovic et al. reference, reducing the amount of light available for processing. Further, while the Mendlovic et al. reference may disclose increasing resolution, this increased resolution would appear to be achievable only under controlled conditions, i.e., conditions allowing for multiple exposure time for which light sensitivity and movement do not present issues, e.g., barcode scanners. There is no suggestion in either reference as to how the two different polarization elements used for each unit including more than one detector according to the Tanida et al. reference would be modified to have sub-pixel sampling, or that shifting, required for the improved resolution of the Mendlovic et al. reference, of such a modified structure would improve resolution.

Second, even assuming *arguendo*, that the combination is proper, the combination still fails to suggest all the limitations of independent claims 1 and 12. In particular, claims 1 and 12 recite, in part, that "each sub-pixel resolution element being smaller than a detector, a pattern of the multiple sub-pixels resolution elements being substantially the same for the plurality of detectors associated with a corresponding lens." In particular, while the slits of the Mendlovic et al. reference may be narrow, i.e., may be less than a width of a pixel, these slits appear to extend along an orthogonal direction for an entirety of the length of the pixel. In other words, when the one-dimensional periodic function is to be applied in a first direction, e.g., an x-direction, a slit having a narrow width in the x-direction, i.e., less than a detector dimension in the x-direction, the slit extends along the y-direction for an entirety of the detector dimension along the y-direction.⁴ A plurality of such slits is arranged periodically along the x-direction.⁵ Thus, while the Mendlovic et al. reference may disclose slits being smaller than a detector along one dimension, these slits do not constitute a pattern

² The Mendlovic et al. reference, col. 6, lines 26-30.

³ *Id.*, col. 13, lines 55-57.

⁴ *Id.*, col. 5, line 64 to col. 6, line 14; col. 14, line 52 to col. 15, line 23.

⁵ *Id.*

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of sub-pixels resolution elements. Further, the Mendlovic et al. reference only discloses using a single lens for the detector array. Therefore, the combination of the Tanida and Mendlovic et al. references fails to suggest, much less disclose, a pattern of the multiple sub-pixels resolution elements being substantially the same for the plurality of detectors associated with a corresponding lens, as recited in claims 1 and 12.

Further, it is respectfully submitted that the Office action acknowledged that the limitations recited in claims 24 and 25 are not disclosed by the combination of the Tanida and Mendlovic et al. references. As noted below, while the Heller et al. reference may teach using no blocking portion, this is in conjunction with detection of a moving image in which adjacent sensors have different blocking portions. The mask in the Heller et al. reference is associated with a field of view, which requires a detector array, so the masks in the Heller et al. reference would not be used with a single detector. Further, as the Mendlovic et al. reference teaches blocking most of the light, allowing only a small fraction thereof to pass through transparent slits, such an open portion may not be used with in conjunction with the Mendlovic et al. reference. Thus, the combination of the Tanida, Mendlovic, and Heller et al. references fails to teach the limitations of claims 24 and 25.

The remaining rejected claims, viz., claims 2-4, 6, 9-11, 13, 15-19, 21-23 and 26-29 depend, either directly or indirectly, from claims 1 and 12, and are believed to be allowable for at least the reasons set forth above. It is therefore respectfully requested that this rejection be withdrawn.

D. Asserted Obviousness Rejection of Claim 5

In the outstanding Office action, claim 5 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of the Bills reference. The Bills reference fails to provide a motivation to combine the Tanida and Mendlovic et al. references or the teachings noted above as missing from the combination. It is therefore respectfully requested that this rejection be withdrawn.

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E. Asserted Obviousness Rejection of Claims 7 and 14

In the outstanding Office action, claims 7 and 14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of the Meyers reference. The Meyers reference fails to provide a motivation to combine the Tanida and Mendlovic et al. references or the teachings noted above as missing from the combination. It is therefore respectfully requested that this rejection be withdrawn.

F. Asserted Obviousness Rejection of Claims 8 and 20

In the outstanding Office action, claims 8 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of the Examiner's Official Notice. The Examiner's Official Notice fails to provide a motivation to combine the Tanida and Mendlovic et al. references or the teachings noted above as missing from the combination. It is therefore respectfully requested that this rejection be withdrawn.

G. Asserted Obviousness Rejection of Claim 31

In the outstanding Office action, claim 31 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the Tanida et al. reference in view of the Mendlovic et al. reference and further in view of the Heller et al. reference. This rejection is respectfully traversed for at least the reasons set forth below.

The Office action recognizes that the combination of the Tanida and Mendlovic et al. references fails to disclose a lens having no blocking portions, relying on Heller as providing this missing teaching. the Heller et al. reference may teach using no blocking portion, this is in conjunction with detection of a moving image in which adjacent sensors have different blocking portions. The mask in the Heller et al. reference is associated with a field of view, which requires a detector array, so the masks in the Heller et al. reference would not be used with a single detector. Further, as the Mendlovic et al. reference teaches blocking most of the

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light, allowing only a small fraction thereof to pass through transparent slits, such an open portion may not be used with in conjunction with the Mendlovic et al. reference. Thus, the combination of the Tanida, Mendlovic, and Heller et al. references fails to teach the limitations of claims 24 and 25.

It is therefore respectfully requested that this rejection be withdrawn.

H. New Claims

Claims 32-36 have been added. Claims 32, 35, and 38 depend from claims 30, 1, and 12, respectively, and recite that the matrix is a Hadamard matrix, as disclosed, for example, in paragraph [0033] of the published application. Claims 33, 34, 36, 37, and 39-40 depend from claims 30, 1, and 12, respectively, and further recite details of the sub-pixel resolution elements, as disclosed, for example, paragraph [0032] to [0037] of the published application. These claims are believed to be allowable for at least the reasons their respective base claims are believed to be allowable.

I. Conclusion

The above remarks demonstrate failings of the Examiner's rationales for the outstanding rejections, and are sufficient to overcome the outstanding rejections. However, these remarks are not intended to, nor need they, comprehensively address each and every reason for the patentability of the claimed subject matter over the applied art. Accordingly, Applicants submit that the claims are allowable for reasons including, but not limited to, those set forth above, and patentability of the claims does not depend solely on the particular claim element discussed above.

If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

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In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

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PETITION and
DEPOSIT ACCOUNT CHARGE AUTHORIZATION

This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, applicant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying papers may also be charged to Deposit Account No. 50-1645.